Mercury in light bulbs

Last week, while watching "The Late Show with David Lettermen," I was horrified to see one of Dave's assistants throw a box of fluorescent bulbs off the roof of the Ed Sullivan Building. I'm sure the producers of the show thought the stunt would elicit a few oohs and aahs – like the times they chucked a prize-winning half-ton pumpkin over the edge to see it explode on the concrete below. But what I bet they didn't realize was the white, fog-like gas rising from the shattering bulbs was chock full of mercury.

The ill-advised stunt prompted me to Google "mercury in fluorescents" on the Internet, which took me to greenerbuildings.com. It was there that architect Eric Corey Freed, author of "Green Building for Dummies," waxed eloquently on the pros and cons of mercury in fluorescents.

Most of what follows are his words and deal specifically with compact fluorescent bulbs. Regular tubular fluorescents work in the same way as compact fluorescents and present the same environmental challenges.

Light bulbs old and new

Compact fluorescent (CFL) bulbs are a type of fluorescent lamp that fits into a standard light bulb socket. Introduced in the 1980s, CFL bulbs have surged in popularity in recent years, due in part to the heightened awareness of the climate crisis and the surging costs of energy.

CFL bulbs are an energy-efficient alternative to the traditional incandescent bulb, which has changed relatively little since Thomas Edison first discovered a long-lasting filament material in 1880.

One problem with incandescent bulbs is 95 percent of the energy consumed by them is emitted as heat, with only about 5 percent given off as light. Not only do incandescent bulbs waste a tremendous amount of energy, the heat they generate often results in the need for more air conditioning and therefore even more energy use. In addition, the bulbs are very fragile and short-lived, averaging only 750 to 1,000 hours of use.

Replacing incandescent bulbs with compact fluorescents saves energy. Removing a 100-watt incandescent bulb and replacing it with a 23-watt CFL will yield the same amount of light. In addition, the new CFL bulb will produce 70 percent less heat, thereby reducing the need for air conditioning. Also, a CFL bulb will typically last 10 times as long as a traditional incandescent, saving $30 or more over the life of each bulb.

If every American home replaced just one regular light bulb with a CFL, we would save enough energy to light more than 2.5 million homes for a year and prevent greenhouse gases equivalent to the emissions of nearly 800,000 cars. Swapping all the world's light bulbs with CFLs would cut energy use by 10 percent worldwide. Such energy reduction would also cut down on powers plant emissions of mercury and other pollutants that contribute to global climate change, acid rain and smog.

How fluorescent bulbs work

Fluorescent bulbs were introduced in 1893 at the World Columbian Exposition in Chicago in 1893. They work by passing an arc of electricity through mercury vapor in the lamp. The charged mercury atoms produce an ultraviolet light, which is absorbed by the

phosphor powder coating on the inside of the tube. When energized, these phosphors emit the white light you see.

To generate the mercury vapor, a small drop of liquid mercury resides in the tube. This mercury is instantly vaporized when the lamp is turned on, only to re-condense when the lamp is turned off.

Unlike an incandescent bulb, the fluorescent bulb has no filament to break or get hot. This is what gives a fluorescent bulb its energy efficiency. But without the mercury vapor, no light would emit from the tube.

The problem with mercury

A four-foot fluorescent tube has an average life of at least 20,000 hours. To achieve this long life, lamps must have a specific quantity of mercury -- typically very small and measured in milligrams.

Mercury is a potent neurotoxin with the potential to build up in the food chain, so even the small amount of it in a bulb is harmful to our health. Mercury poisoning has been linked to a skyrocketing rate of autism in children, as well as to numerous other health problems, including endocrine disruption and cardiovascular disease.

It only takes $1/70^{th}$ of a teaspoon of mercury to contaminate a 20-acre body of water and make all the fish within it toxic to humans. This is about the amount of mercury in a typical thermometer.

Are fluorescents worth it?

So, which is worse, to use an incandescent bulb , which indirectly spreads mercury by using electricity, or to use a fluorescent bulb, which directly spreads mercury when we throw it away (or in the case of “The Late Show,” throw it off a building)?

The short answer: Continuing the use of incandescent bulbs is much worse. The long answer factors in using low-mercury bulbs, safe disposal of the bulbs and other technologies.

Several manufacturers now offer low-mercury bulbs. Philips’ ALTO bulbs offer mercury content only 13 to 25 percent of typical fluorescent bulbs with no sacrifice in longevity or performance. Osram-Sylvania also makes low-mercury bulbs.

Disposal issues

While offering tremendous environmental advantages through energy savings, the disposal of used fluorescent lighting raises some serious environmental concerns.

Never throw a fluorescent tube or compact fluorescent bulb into the garbage because it will just end up in the landfill (and don’t throw it on the ground just to watch it explode!).

At present, Ravalli County doesn’t have a hazardous materials collection event, and the transfer station at Victor is not licensed to handle hazardous materials. For now the best option for people to dispose of fluorescent bulbs is to take them to Pete’s Palmer Electric in Missoula, 2407 Harve (543-3086) where they will be disposed of at a cost of $1.42 each.

The Environmental Heath Department is currently searching for funding to dispose of fluorescent bulbs and other hazardous materials. If anyone has any suggestions on where we could go for such funding please contact us.

In order to help citizens understand more clearly many of the environmental health issues in Ravalli County and the role of the Environmental Health Department in addressing these issues, our department will run a series of weekly articles titled "Environmental Health Talk."

In this ongoing series we hope to help raise the community's awareness of issues such as air and water quality and give readers useful tips on topics like recycling, collecting and disposing of hazardous materials and maintaining septic systems, just to name a few. To this end, we welcome pubic comment. If there's an environmental health issue you'd like us to address, write call or email the department: RCEH, c/o "EnviroHealth Talk," 215 South 4th St, Suite D, Hamilton MT 59840. Phone: 375-6571. Email: rdaniel@ravallicounty.mt.gov